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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,941	10/08/2004	Jens Tonnc Andersen	10297.204-US	1508
25908	7590	09/25/2007	EXAMINER	
NOVOZYMES NORTH AMERICA, INC. 500 FIFTH AVENUE SUITE 1600 NEW YORK, NY 10110				ROBINSON, HOPE A
ART UNIT		PAPER NUMBER		
1652				
MAIL DATE		DELIVERY MODE		
09/25/2007		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/510,941	ANDERSEN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Hope A. Robinson	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 22 January 2007.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 41-62 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 41-62 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>1/22/07</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application
	6) <input checked="" type="checkbox"/> Other: <u>Notice to Comply</u> .

## **DETAILED ACTION**

### ***Application Status***

1. Applicant's response to the Office Action mailed July 28, 2006, on January 22, 2007 is acknowledged.

### ***Claim Disposition***

2. Claims 41-62 are pending and are under examination.
3. The following objections and rejections are or remain applicable.

### ***Sequence Compliance***

4. This application contains sequence disclosures that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 CFR 1.821(a)(1) and (a)(2). However, this application fails to comply with the requirements of 37 CFR 1.821 through 1.825; applicant's attention is directed to the final rule making notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990). To be in compliance, applicant is required to identify all amino acid sequences of at least 4 L-amino acids and at least 10 nucleotides by a sequence identifier, i.e., "SEQ ID NO:". It is noted that applicant filed a CFR and Sequence listing on October 8, 2004 , however the sequence erred which is outlined on the error report. If these sequences have not been disclosed in the computer readable form of the sequence listing and the paper

copy thereof, applicant must provide a computer readable form of the "Sequence Listing" including these sequences, a paper copy of the "Sequence Listing", as well as an amendment directing its entry into the specification, and a statement that the content of the paper and computer readable form copies are the same and, where applicable, include no new matter as required by 37 CFR 1.821(e) or 1.821(f) or 1.821(g) or 1.821(b) or 1.825(d). See the attached Notice to Comply with the sequence rules and error report.

### ***Claim Objection***

5. Claims 41, 48 and 54-55 are objected to because of the following informalities:

For clarity and precision of claim language it is suggested that the phrase "identical host cell" is deleted from the claim and instead replaced with "the parent *Bacillus licheniformis* host cell", because it is unclear what constitutes "identical", if it is based on function, sequence or some other parameter.

For clarity and precision of claim language it is suggested that claim 48 is amended to read "The host cell of claim 43, wherein the heterologous gene(s) are in an operon".

For clarity and precision of claim language it is suggested that claim 54 is amended to read, "The host cell of claim 53, wherein the enzymes are selected from the group consisting of oxidoreductases (EC1), transferases (EC2)....":

For clarity it is suggested that claim 55 is amended to read, "The host cell of claim 53, wherein the enzymes have an activity selected from the group consisting of aminopeptidase..."

Correction is required.

***Claim Rejections - 35 USC 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 41-62 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method of making proteins in a host cell, does not enable a method to produce any products or the genus of heterologous proteins/genes encompassed in the claims. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The enablement requirement refers to the requirement that the specification describe how to make and how to use the invention. There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does

not satisfy the enablement requirement and whether any necessary experimentation is undue. These factors include, but are not limited to: Quantity of Experimentation Necessary; Amount of direction or guidance presented; Presence or absence of working examples; Nature of the Invention; State of the prior art and Relative skill of those in the art; Predictability or unpredictability of the art and Breadth of the claims (see *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404 (Fed. Cir. 1988). The factors most relevant to the instant invention are discussed below.

*In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970) states that, "The amount of guidance or direction needed to enable the invention is inversely related to the amount of knowledge in the state of the art as well as the predictability in the art". "The amount of guidance or direction" refers to that information in the application, as originally filed, that teaches exactly how to make or use the invention. The more that is known in the prior art about the nature of the invention, how to make, and how to use the invention, and the more predictable the art is, the less information needs to be explicitly stated in the specification. In contrast, if little is known in the prior art about the nature of the invention and the art is unpredictable, the specification would need more detail as to how to make and use the invention in order to be enabling" (MPEP 2164.03). The MPEP further states that physiological activity can be considered inherently unpredictable. Thus, applicant assumes a certain burden in establishing that inventions involving physiological activity are enabled.

The claimed invention is directed to a "A *Bacillus licheniformis* mutant host cell, said mutant host cell is derived from a parent *Bacillus licheniformis* which mutant host

cell comprises a mutation in a gene encoding a polypeptide involved in antibiotic synthesis, wherein said gene is native to said host cell, and wherein said gene encodes a polypeptide which is at least 95% identical to the polypeptide of SEQ ID NO:2", however, the instant specification does not provide support for the claims as they are broadly drawn and encompass an unspecified amount of heterologous genes and polypeptides. In addition, the claims broadly read on any polypeptide involved in antibiotic synthesis and the instant specification does not clearly define "how involved".

The quantity of experimentation necessary would be undue as the claims encompass an unspecified amount of heterologous genes and proteins. Furthermore, no reasonable correlation is made between function and structure. Additionally, the claims recite that genes are either partially or completely deleted to produce the claimed mutant host cell, however, there is no indication of what genes. . For instance the art demonstrated via precise deletions in tagB, tagF and tarD, a disturbance in the teichoic acids found in the wall of the gram-positive bacteria *Bacillus subtilis* based on gene deletions ( see, Bhavsar et al., Journal of Bacteriology, December 2004, vol. 186, no. 23, pages 7865-7873). As the art supports the unpredictability of structural modifications, a correlation between structure and function is critical in view of the mutations contemplated in the instant application in a similar organism to a greater extent. Further the claims recite the open language of "comprising" thus there is no limit on how many genes can be completely deleted, no limit on the percentage of how much polypeptides are expressed in a lesser amount based on said mutation, no limit on the number of heterologous genes or polypeptides. Moreover the claims to the recited

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process are unlimited with respect to what "product of interest" is used. It is noted that the instant specification discloses a protein product, however, the claims read on any product, which is not supported by the disclosure. The issue in this case is the breadth of the claims in light of the predictability of the art as determined by the number of working examples, the skill level artisan and the guidance presented in the instant specification and the prior art of record. Therefore, for all these reasons the claimed invention is not enabled and specification is not commensurate in scope with the claims.

7. Claims 41-62 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claimed invention is directed to a "A *Bacillus licheniformis* mutant host cell, said mutant host cell is derived from a parent *Bacillus licheniformis* which mutant host cell comprises a mutation in a gene encoding a polypeptide involved in antibiotic synthesis, wherein said gene is native to said host cell, and wherein said gene encodes a polypeptide which is at least 95% identical to the polypeptide of SEQ ID NO:2", however, the instant specification does not provide adequate written description because the claims encompass an unspecified amount of heterologous genes and polypeptides. In addition, the claims broadly read on any polypeptide involved in antibiotic synthesis and the instant specification does not clearly define "how involved". The specification provides no information on the function of a polypeptide whose

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sequence is disclosed in SEQ ID NO:2, other than the involvement in antibiotic synthesis, or any particular region or amino acids thereof which have any significance to this function of the polypeptide or identified any conserved regions/domains. The disclosure is not deemed to be descriptive of the complete structure of a representative number of species encompassed by the claims as one skilled in the art cannot envision all the mutant host cells having mutations in genes encoding polypeptides which are involved in "antibiotic synthesis", for example. The specification provides no information regarding the precise amino acids, or even which general regions of the polypeptide whose sequence is shown in SEQ ID NO:2, can be altered, and remain involved in antibiotic synthesis. There is no structure-function analysis of the disclosed polypeptide shown in SEQ ID NO:2 that could be modified and retain function in antibiotic synthesis. Thus, the claimed invention is directed to a large variable genus, for which the specification fails to provide any additional representative species of the claimed genus, to show that applicant was in possession of the claimed genus.

A representative number of species means that the species, which are adequately described are representative of the entire genus. The written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species by actual reduction to practice, disclosure of drawings, or by disclosure of relevant identifying characteristics, for example, structure or other physical and/or chemical properties, by functional characteristics coupled with a known or disclosed correlation between function and structure, or by a combination of

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such identifying characteristics, sufficient to show the applicant was in possession of the claimed genus.

Further, *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991), states that "applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention. The invention is, for purposes of the 'written description' inquiry, whatever is now claimed" (See page 1117). The specification does not "clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed" (See *Vas-Cath* at page 1116). The skilled artisan cannot envision the detailed chemical structure of the encompassed genus of polypeptides, and therefore, conception is not achieved until reduction to practice has occurred, regardless of the complexity or simplicity of the method of isolation. Adequate written description requires more than a mere statement that it is part of the invention and reference to a potential method of isolating it. The compound itself is required. See *Fiers v. Revel*, 25 USPQ2d 1601 at 1606 (CAFC 1993).

Therefore, for all these reasons the specification lacks adequate written description, and one of skill in the art cannot reasonably conclude that the applicant had possession of the claimed invention at the time the instant application was filed.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

8. Claims 41-62 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter, which applicant (s) regard as their invention.

Claim 41 is confusing, the claim recites "A *Bacillus licheniformis* mutant host cell, said mutant host cell is derived from a parent *Bacillus licheniformis* which mutant host cell comprises a mutation in a gene encoding a polypeptide involved in antibiotic synthesis, wherein said gene is native to said host cell, and wherein said gene encodes a polypeptide which is at least 95% identical to the polypeptide of SEQ ID NO:2", because the claim recites "a gene that encodes a polypeptide involved in antibiotic synthesis" and also recites "said gene encodes a polypeptide which is at least 95% identical to SEQ ID NO:2" and it is unclear whether the polypeptide with the activity is the same as the polypeptide that has 95% identity to SEQ ID NO:2. Thus it is also unclear which of the recited polypeptides yields 5% less expression. Further the claim is unclear as to how the gene is mutated to produce said "mutated host cell". It is noted that claim 42 recites that said mutation occurs via deletion of a gene, however, independent claim 41 has to stand on its own. The dependent claims hereto are also included in this rejection.

Claim 42 is indefinite for the recitation of "a partial or complete deletion of said gene in claim 41", because how can a completely deleted gene express a polypeptide. Moreover, the instant specification discloses that the mutation is as a result of "...a partial or complete deletion of the one or more gene(s) encoding the one or more polypeptide(s) involved in antibiotic synthesis (see paragraph [0019]). Thus, it appears that several genes and polypeptides are involved in the antibiotic synthesis, which is only reflected in claim 43. Further, see also claim 59 for similar language.

Claim 50 is indefinite for the recitation of "an intermediate of interest", because it is unclear what constitutes an intermediate of interest, and no definition is provided in the specification.

***Response to Arguments***

9. The response filed has been considered. The rejections of record have been withdrawn based on applicant's amendments to the claims. Note that the rejections instituted under 35 U.S.C. 112, first paragraph are for different reasoning than previously of record, thus applicant's arguments are moot. The rejections herein are in place for the reasons stated above.

***Conclusion***

10. No claims are presently allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hope A. Robinson whose telephone number is 571-272-0957. The examiner can normally be reached on Monday-Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapu Achutamurthy, can be reached at (571) 272-0928. The fax

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phone number for the organization where this application or proceeding is assigned is  
571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hope Robinson, MS  
Primary Examiner

9/21/07

HOPE ROBINSON  
PRIMARY EXAMINER

**NOTICE TO COMPLY WITH REQUIREMENTS FOR PATENT APPLICATIONS CONTAINING NUCLEOTIDE SEQUENCE AND/OR AMINO ACID SEQUENCE DISCLOSURES**

Applicant must file the items indicated below within the time period set the Office action to which the Notice is attached to avoid abandonment under 35 U.S.C. § 133 (extensions of time may be obtained under the provisions of 37 CFR 1.136(a)).

The nucleotide and/or amino acid sequence disclosure contained in this application does not comply with the requirements for such a disclosure as set forth in 37 C.F.R. 1.821 - 1.825 for the following reason(s):

1. This application clearly fails to comply with the requirements of 37 C.F.R. 1.821-1.825. Applicant's attention is directed to the final rulemaking notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990). If the effective filing date is on or after July 1, 1998, see the final rulemaking notice published at 63 FR 29620 (June 1, 1998) and 1211 OG 82 (June 23, 1998).
2. This application does not contain, as a separate part of the disclosure on paper copy, a "Sequence Listing" as required by 37 C.F.R. 1.821(c).
3. A copy of the "Sequence Listing" in computer readable form has not been submitted as required by 37 C.F.R. 1.821(e).
4. A copy of the "Sequence Listing" in computer readable form has been submitted. However, the content of the computer readable form does not comply with the requirements of 37 C.F.R. 1.822 and/or 1.823, as indicated on the attached copy of the marked -up "Raw Sequence Listing."
5. The computer readable form that has been filed with this application has been found to be damaged and/or unreadable as indicated on the attached CRF Diskette Problem Report. A Substitute computer readable form must be submitted as required by 37 C.F.R. 1.825(d).
6. The paper copy of the "Sequence Listing" is not the same as the computer readable form of the "Sequence Listing" as required by 37 C.F.R. 1.821(e).
7. Other: See Raw Sequence Listing Error Report

**8. Applicant Must Provide:**

- An initial or substitute computer readable form (CRF) copy of the "Sequence Listing".
- An initial or substitute paper copy of the "Sequence Listing", as well as an amendment directing its entry into the specification.
- A statement that the content of the paper and computer readable copies are the same and, where applicable, include no new matter, as required by 37 C.F.R. 1.821(e) or 1.821(f) or 1.821(g).

For questions regarding compliance to these requirements, please contact:

- For Rules Interpretation, call (703) 308-4216 or (703) 308-2923
- For CRF Submission Help, call (703) 308-4212
- For PatentIn software Program Support:
  - HELP DESK: (703) 739-8559, ext 508, M-F, 8 AM to 5 PM EST except holidays
  - Email: [PATIN21HELP@uspto.gov](mailto:PATIN21HELP@uspto.gov)
  - To purchase PatentIn software: (703) 306-2600

**PLEASE RETURN A COPY OF THIS NOTICE WITH YOUR RESPONSE**

# Notice To Comply

08-OCT-2004

## CRF Errors Edited by the STIC Systems Branch

Serial Number: 10510,941

CRF Edit Date: 10-22-04  
Edited by: KL

Reason(s): Realigned nucleic acid/amino acid numbers/text in cases where the sequence text "wrapped" to the next line

\_\_\_ Corrected the SEQ ID NO. Sequence numbers edited were:

\_\_\_ Inserted or corrected a nucleic number at the end of a nucleic line. SEQ ID NO's edited:

Deleted: invalid beginning/end-of-file text; page numbers

\_\_\_ Inserted mandatory headings/numeric identifiers, specifically:

\_\_\_ Moved responses to same line as heading/numeric identifier, specifically:

\_\_\_ Other:

PCT/PCT/04/08 OCT 2004



PCT

RAW SEQUENCE LISTING  
PATENT APPLICATION: US/10/510,941

DATE: 10/22/2004  
TIME: 09:18:29

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3 <110> APPLICANT: Jorgensen, Steen Troels  
 4 Rasmussen, Michael Dolberg  
 5 Andersen, Jens Tonne  
 6 Olesen, Peter Bjarke  
 7 Clausen, Ib Groth  
 9 <120> TITLE OF INVENTION: Improved Bacillus Host Cell  
 11 <130> FILE REFERENCE: 10297.204-US  
 C--> 13 <140> CURRENT APPLICATION NUMBER: US/10/510,941  
 C--> 13 <141> CURRENT FILING DATE: 2004-10-08  
 13 <160> NUMBER OF SEQ ID NOS: 22  
 15 <170> SOFTWARE: PatentIn version 3.3  
 17 <210> SEQ ID NO: 1  
 18 <211> LENGTH: 1602  
 19 <212> TYPE: DNA  
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 24 <221> NAME/KEY: CDS  
 25 <222> LOCATION: (501)..(1421)  
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 48 aaa acg atc agg ggg aaa aag atc atc gag ggc ttg agt ttt gac gtg 581  
 49 Lys Thr Ile Arg Gly Lys Ile Ile Glu Gly Leu Ser Phe Asp Val  
 50 15 20 25  
 52 cgg gca ggc gag ata ttc ggc ttc ctg ggg ccg aac ggc gcc gga aaa 629  
 53 Arg Ala Gly Glu Ile Phe Gly Phe Leu Gly Pro Asn Gly Ala Gly Lys  
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RAW SEQUENCE LISTING  
PATENT APPLICATION: US/10/510,941

DATE: 10/22/2004  
TIME: 09:18:29

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82 140           145           150           155	
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85 Leu Asp Glu Pro Thr Asn Gly Leu Asp Pro Ala Gly Ile Arg Glu Ile	
86              160              165              170	
88 cgt gac tat tta aga aag ctg acg aga gaa aag gga atg gcg gtc atc	1061
89 Arg Asp Tyr Leu Arg Lys Leu Thr Arg Glu Lys Gly Met Ala Val Ile	
90              175              180              185	
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94              190              195              200	
96 gcc att att caa aac gga aag ctc cgg gat att cag cat gtg cac gga	1157
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98              205              210              215	
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122 300           305	
124 ttttaatcga aaaggcacat acgtcatgat cggaatttg ctgttagctg tcatgggct	1511
126 gggcgttctc acaaagacga tcggagagac agacaaaaac acggactgga aaaaggaatt	1571
128 ggcgcaggaa ataaggacaa gggggcttag t	1602
131 <210> SEQ ID NO: 2	
132 <211> LENGTH: 307	

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133 <212> TYPE: PRT  
 134 <213> ORGANISM: Bacillus licheniformis  
 136 <400> SEQUENCE: 2  
 138 Leu Glu Thr Leu Leu Glu Leu Lys Asn Val Ser Lys Thr Ile Arg Gly  
 139 1 5 10 15  
 142 Lys Lys Ile Ile Glu Gly Leu Ser Phe Asp Val Arg Ala Gly Glu Ile  
 143 20 25 30  
 146 Phe Gly Phe Leu Gly Pro Asn Gly Ala Gly Lys Thr Thr Ile Arg  
 147 35 40 45  
 150 Met Ile Val Gly His Met Ser Ile Thr Ala Gly Glu Ile Ala Val Cys  
 151 50 55 60  
 154 Gly Val Ser Val Lys Glu Asn Phe Glu Lys Ala Ala Arg His Ile Gly  
 155 65 70 75 80  
 158 Ala Ile Val Glu Asn Pro Glu Leu Tyr Lys Phe Leu Thr Gly Tyr Gln  
 159 85 90 95  
 162 Asn Leu Gln Gln Tyr Ala Arg Met Thr Lys Gly Val Thr Lys Lys  
 163 100 105 110  
 166 Ile Asp Glu Ile Val Glu Leu Val Gly Leu Lys Asn Arg Ile Asn Asp  
 167 115 120 125  
 170 Lys Val Lys Thr Tyr Ser Leu Gly Met Arg Gln Arg Leu Gly Leu Ala  
 171 130 135 140  
 174 Gln Ser Leu Leu His Asp Pro Lys Leu Leu Ile Leu Asp Glu Pro Thr  
 175 145 150 155 160  
 178 Asn Gly Leu Asp Pro Ala Gly Ile Arg Glu Ile Arg Asp Tyr Leu Arg  
 179 165 170 175  
 182 Lys Leu Thr Arg Glu Lys Gly Met Ala Val Ile Val Ser Ser His Leu  
 183 180 185 190  
 186 Leu Ser Glu Met Glu Leu Met Cys Asp Arg Ile Ala Ile Ile Gln Asn  
 187 195 200 205  
 190 Gly Lys Leu Arg Asp Ile Gln His Val His Gly Pro Ala Arg Asp Glu  
 191 210 215 220  
 194 Lys Lys Arg Tyr Tyr Ile Gln Ala Asp Asp Thr Gln Ala Leu Thr Arg  
 195 225 230 235 240  
 198 Glu Ala Ala Ala Phe Arg Lys Val Lys Val Asp Glu Ala Glu Gly  
 199 245 250 255  
 202 Ile Glu Leu Ser Ile Gln Lys Asp Glu Val Pro Asp Leu Ile Lys His  
 203 260 265 270  
 206 Leu Thr Asp Ser Gly Val Arg Leu Tyr Glu Val Lys Ala Val Asn Lys  
 207 275 280 285  
 210 Ser Leu Glu Asp Arg Phe Leu Glu Ile Thr Ala Asp Lys Glu Glu Ala  
 211 290 295 300  
 214 Gln His Val  
 215 305  
 218 <210> SEQ ID NO: 3  
 219 <211> LENGTH: 1938  
 220 <212> TYPE: DNA  
 221 <213> ORGANISM: Bacillus licheniformis  
 224 <220> FEATURE:  
 225 <221> NAME/KEY: CDS

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226 <222> LOCATION: (501)..(1457)		
228 <400> SEQUENCE: 3		
229 cgcacatggac ttttgaacgt cggaaccgaa gataaaaaag gaaatgagct tgccaaggcag	60	
231 acctttcaaa aatttgaagga aaccgattt aatttcattcg gcaatgttgg a gcccggcgat	120	
233 atgctggacg gagtcgctga tgtcatcg tc acagacggct ttaccggtaa cgttgccttg	180	
235 aaaacggctcg agggcgccgc gctgtccatt tttaaaatgc tgagaacgac gctgacttcg	240	
237 agcttcacgg cgaagctcgc cgcttctgca ctgaagccga agctgaaaaga aatgaaaacg	300	
239 aaaatggatt actctgaata cggccggagcc ggattgttcg gcttaaaggc gccccgtcatc	360	
241 aaagcgcacg gatcatctga cggacgcgcc gtttatcagc cgatccgcca ggccagagag	420	
243 atggtcagcc aaaatgtcgc ggcatttatac gaagaaaaaa ttcaacaaaaa agcagatgaa	480	
245 tagtctggag gtttaaacac atg ggc aag att gct ttt cta ttc ccg ggc caa	533	
246 Met Gly Lys Ile Ala Phe Leu Phe Pro Gly Gln		
247 1 5 10		
249 ggt tcg cag cat atc ggc atg gga cac gaa ttg tat gaa aaa gaa ccg	581	
250 Gly Ser Gln His Ile Gly Met Gly Glu Leu Tyr Glu Lys Glu Pro		
251 15 20 25		
253 aat gcg aag aag att ttt gaa gaa gcg gat caa acg ctt gaa aca aca aaa	629	
254 Asn Ala Lys Lys Ile Phe Glu Glu Ala Asp Gln Thr Leu Glu Thr Lys		
255 30 35 40		
257 ctg agc acc ctc atg ttt gaa ggg gat gca aag gaa ctg acg ctt aca	677	
258 Leu Ser Thr Leu Met Phe Glu Gly Asp Ala Lys Glu Leu Thr Leu Thr		
259 45 50 55		
261 tac aac gcg cag cca agc ctt tta acg gcg agc atc gca gcg ctt gaa	725	
262 Tyr Asn Ala Gln Pro Ser Leu Leu Thr Ala Ser Ile Ala Ala Leu Glu		
263 60 65 70 75		
265 aaa ctg aag gaa tac ggc att aaa gcc gac tat gcg gca ggt cac agc	773	
266 Lys Leu Lys Glu Tyr Gly Ile Lys Ala Asp Tyr Ala Ala Gly His Ser		
267 80 85 90		
269 ctc ggc gaa tac agc gca ttg gtc gct gcc ggc gcc ttg tcg ttt aaa	821	
270 Leu Gly Glu Tyr Ser Ala Leu Val Ala Ala Gly Ala Leu Ser Phe Lys		
271 95 100 105		
273 gat gcg gtt tat gcc gtc aga aag cgc ggc gaa ttc atg aat gaa gcc	869	
274 Asp Ala Val Tyr Ala Val Arg Lys Arg Gly Glu Phe Met Asn Glu Ala		
275 110 115 120		
277 gtg ccg gcg gga gaa ggc gcg atg gcg gcc att ctc ggc atg gac agc	917	
278 Val Pro Ala Gly Glu Gly Ala Met Ala Ala Ile Leu Gly Met Asp Ser		
279 125 130 135		
281 cag gcg ctg aaa gaa gtg acg gac aaa att tcc gaa gaa gga aac ctt	965	
282 Gln Ala Leu Lys Glu Val Thr Asp Lys Ile Ser Glu Glu Gly Asn Leu		
283 140 145 150 155		
285 gtt cag ctc gcc aat ttg aac tgc cct ggg caa atc gtc atc tcg gga	1013	
286 Val Gln Leu Ala Asn Leu Asn Cys Pro Gly Gln Ile Val Ile Ser Gly		
287 160 165 170		
289 aca gct aaa ggc gtg gag ctc gct tca gag ctt gcg aaa gaa aag ggc	1061	
290 Thr Ala Lys Gly Val Glu Leu Ala Ser Glu Leu Ala Lys Glu Lys Gly		
291 175 180 185		
293 gca aaa cgc gcg att cct ctc gaa gtc agc ggg ccg ttc cat tct gag	1109	
294 Ala Lys Arg Ala Ile Pro Leu Glu Val Ser Gly Pro Phe His Ser Glu		
295 190 195 200		

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297	ctg	atg	aag	ccg	gca	gct	gat	aag	ctt	cgt	gaa	gtt	ctt	gat	gcg	tgc	1157
298	Leu	Met	Lys	Pro	Ala	Ala	Asp	Lys	Leu	Arg	Glu	Val	Leu	Asp	Ala	Cys	
299	205				210				215								
301	acg	atc	aac	gac	gca	gcc	att	ccg	gtc	gtc	tcc	aac	gta	acg	gcc	gac	1205
302	Thr	Ile	Asn	Asp	Ala	Ala	Ile	Pro	Val	Val	Ser	Asn	Val	Thr	Ala	Asp	
303	220				225				230				235				
305	ttt	gta	acg	gat	aaa	gac	gac	att	aag	aat	aaa	ctg	att	gaa	cag	ctg	1253
306	Phe	Val	Thr	Asp	Lys	Asp	Asp	Ile	Lys	Asn	Lys	Leu	Ile	Glu	Gln	Leu	
307					240				245				250				
309	tat	tcc	cct	gta	cgc	ttt	gaa	gaa	aca	atc	acg	cgc	ctg	att	gac	gaa	1301
310	Tyr	Ser	Pro	Val	Arg	Phe	Glu	Glu	Thr	Ile	Ser	Arg	Leu	Ile	Asp	Glu	
311					255				260				265				
313	ggc	gtc	acg	acc	ttc	att	gaa	atc	ggt	ccc	gga	aag	gtt	ttg	tca	ggg	1349
314	Gly	Val	Thr	Thr	Phe	Ile	Glu	Ile	Gly	Pro	Gly	Lys	Val	Leu	Ser	Gly	
315					270				275				280				
317	ctt	gtg	aag	aaa	gtg	aac	cgc	aga	gtc	aaa	acg	att	gct	gta	tca	gac	1397
318	Leu	Val	Lys	Lys	Val	Asn	Arg	Arg	Val	Lys	Thr	Ile	Ala	Val	Ser	Asp	
319					285				290				295				
321	ccg	aac	aca	att	gaa	ctt	gcc	gtt	caa	acg	ttg	aag	gag	gaa	aac	gaa	1445
322	Pro	Asn	Thr	Ile	Glu	Leu	Ala	Val	Gln	Thr	Leu	Lys	Glu	Glu	Asn	Glu	
323	300				305				310				315				
325	aat	gct	gga	aaa	taaaacagcc	gttgtgacag	gagcctcaag	aggaaatcgcc									1497
326	Asn	Ala	Gly	Lys													
329	cgcgcgatcg	ccctggacct	ggcgaaaaac	ggagcaatag	tcgtcgtaa	ctacgcggga											1557
331	aatgaagcga	aagcgaacga	agtctgttagac	gaaatcaaag	cgctcgcccg	cgatcggtt											1617
333	gctttaaag	cggcgttgc	caatgcggat	gagggtcagg	cgatgtatgaa	ggaagcggtc											1677
335	ggacgcgttcg	gcacgcgttgc	catccttgtc	aacaatgcgg	gcattactaa	agacaatctg											1737
337	ttcatgagaa	tgaaagaaga	tgaatggac	gacgtcatta	acataaaactt	aaaagggtgt											1797
339	ttcaattgtt	caaaaagctgt	gacaagacag	atgtatgaaac	aaagaagcgg	ccggatcatac											1857
341	aatatcacat	cggttgttagg	cgtcgctggt	aacgccgggc	aggccaacta	tgtcgccggct											1917
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346	<210>	SEQ ID NO:	4														
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349	<213>	ORGANISM:	Bacillus licheniformis														
351	<400>	SEQUENCE:	4														
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354	1				5				10					15			
357	Gly	Met	Gly	His	Glu	Leu	Tyr	Glu	Lys	Glu	Pro	Asn	Ala	Lys	Lys	Ile	
358					20				25					30			
361	Phe	Glu	Ala	Asp	Gln	Thr	Leu	Glu	Thr	Lys	Leu	Ser	Thr	Leu	Met		
362					35				40					45			
365	Phe	Glu	Gly	Asp	Ala	Lys	Glu	Leu	Thr	Leu	Thr	Tyr	Asn	Ala	Gln	Pro	
366					50				55					60			
369	Ser	Leu	Leu	Thr	Ala	Ser	Ile	Ala	Ala	Leu	Glu	Lys	Leu	Glu	Tyr		
370					65				70					75			80
373	Gly	Ile	Lys	Ala	Asp	Tyr	Ala	Ala	Gly	His	Ser	Leu	Gly	Glu	Tyr	Ser	
374					85				90					95			
377	Ala	Leu	Val	Ala	Ala	Gly	Ala	Leu	Ser	Phe	Lys	Asp	Ala	Val	Tyr	Ala	

VERIFICATION SUMMARY

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L:13 M:270 C: Current Application Number differs, Replaced Current Application No  
L:13 M:271 C: Current Filing Date differs, Replaced Current Filing Date